

UNITED STATES PATENT AND TRADEMARK OFFICE
CERTIFICATE OF CORRECTION

PATENT NO. : 7,554,959 B1
APPLICATION NO. : 10/687215
DATED : June 30, 2009
INVENTOR(S) : Mary G. Dowling

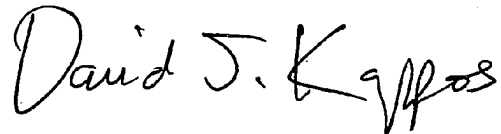
Page 1 of 11

It is certified that error appears in the above-identified patent and that said Letters Patent is hereby corrected as shown below:

Please delete drawing sheets 1-9 figures 1, 2A, 2B, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 13, 14 and 15 and substitute the attached sheets.

Signed and Sealed this

Eighth Day of September, 2009

A handwritten signature in black ink, reading "David J. Kappos". The signature is written in a cursive, flowing style with a large initial 'D' and a stylized 'K'.

David J. Kappos
Director of the United States Patent and Trademark Office

(12) **United States Patent**
Dowling

(10) **Patent No.:** **US 7,554,959 B1**
(45) **Date of Patent:** ***Jun. 30, 2009**

(54) **APPARATUS AND METHOD FOR CLUSTER NETWORK DEVICE DISCOVERY**

(75) Inventor: **Mary G. Dowling, San Jose, CA (US)**

(73) Assignee: **Cisco Technology, Inc., San Jose, CA (US)**

(*) Notice: Subject to any disclaimer, the term of this patent is extended or adjusted under 35 U.S.C. 154(b) by 820 days.

This patent is subject to a terminal disclaimer.

(21) Appl. No.: **10/687,215**

(22) Filed: **Oct. 15, 2003**

Related U.S. Application Data

(63) Continuation of application No. 09/453,163, filed on Dec. 2, 1999, now Pat. No. 6,636,499.

(51) Int. Cl. **H04W 4/00** (2009.01)

(52) U.S. Cl. **370/338; 370/389; 370/388**

(58) Field of Classification Search **None**
See application file for complete search history.

(56) **References Cited**

U.S. PATENT DOCUMENTS

4,644,532 A	2/1987	George et al.	370/94
4,922,486 A	5/1990	Lidinsky et al.	370/60
4,933,937 A	6/1990	Konishi	370/85.13
4,962,497 A	10/1990	Ferenc et al.	370/60.1
5,018,137 A *	5/1991	Backes et al.	370/401
5,095,480 A	3/1992	Fenner	370/94.1
5,136,580 A	8/1992	Vidlock et al.	370/60
5,150,464 A	9/1992	Sidhu et al.	
5,241,682 A	8/1993	Bryant et al.	395/800
5,274,631 A	12/1993	Bhardwaj	370/60

5,280,480 A	1/1994	Pitt et al.	370/85.13
5,287,103 A	2/1994	Kasprzyk et al.	340/825.52
5,319,644 A	6/1994	Liang	370/85.5
5,371,852 A	12/1994	Attanasio et al.	395/200
5,394,402 A	2/1995	Ross	370/94.1
5,430,715 A	7/1995	Corbalis et al.	370/54
5,519,706 A	5/1996	Bantz et al.	
5,526,489 A	6/1996	Nilakantan et al.	
5,530,963 A	6/1996	Moore et al.	395/200.15
5,574,860 A *	11/1996	Perlman et al.	709/220
5,594,732 A	1/1997	Bell et al.	370/401
5,617,421 A	4/1997	Chin et al.	370/402

(Continued)

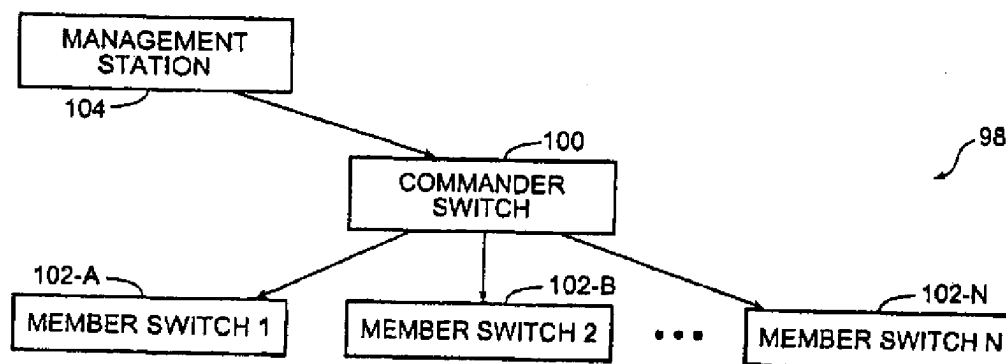
Primary Examiner—Robert W Wilson

(74) Attorney, Agent, or Firm—Bainwood Huang

(57) **ABSTRACT**

A group of network devices, such as Ethernet switches, are logically configured as a single cluster, with one commander device and one or more member devices. Each network device capable of belonging to a cluster transmits data packets containing cluster capability information to its neighbors. Each network device capable of belonging to a cluster that receives data packets containing cluster capability information maintains a database containing information about its cluster-capable neighbor devices. The commander device of a cluster is the point-of-contact through which the cluster is managed. The commander device maintains a database of neighbors of the entire cluster. Upon user request, the commander device displays a list of cluster neighbors and notes which ones may be added to the cluster. When the user adds a device to the cluster, that device immediately sends its database of discovered neighbors to the commander device. The commander device adds those neighbors to its database and displays them at the user's next request. Thus, a user is informed of which switches are available to be added to a cluster at any given time.

75 Claims, 16 Drawing Sheets



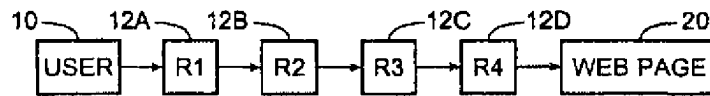


FIG. 1

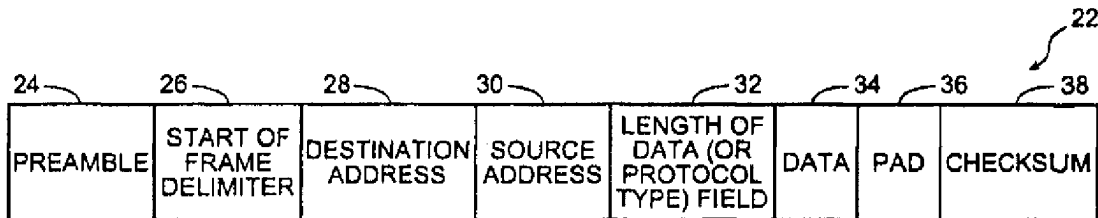


FIG. 2A

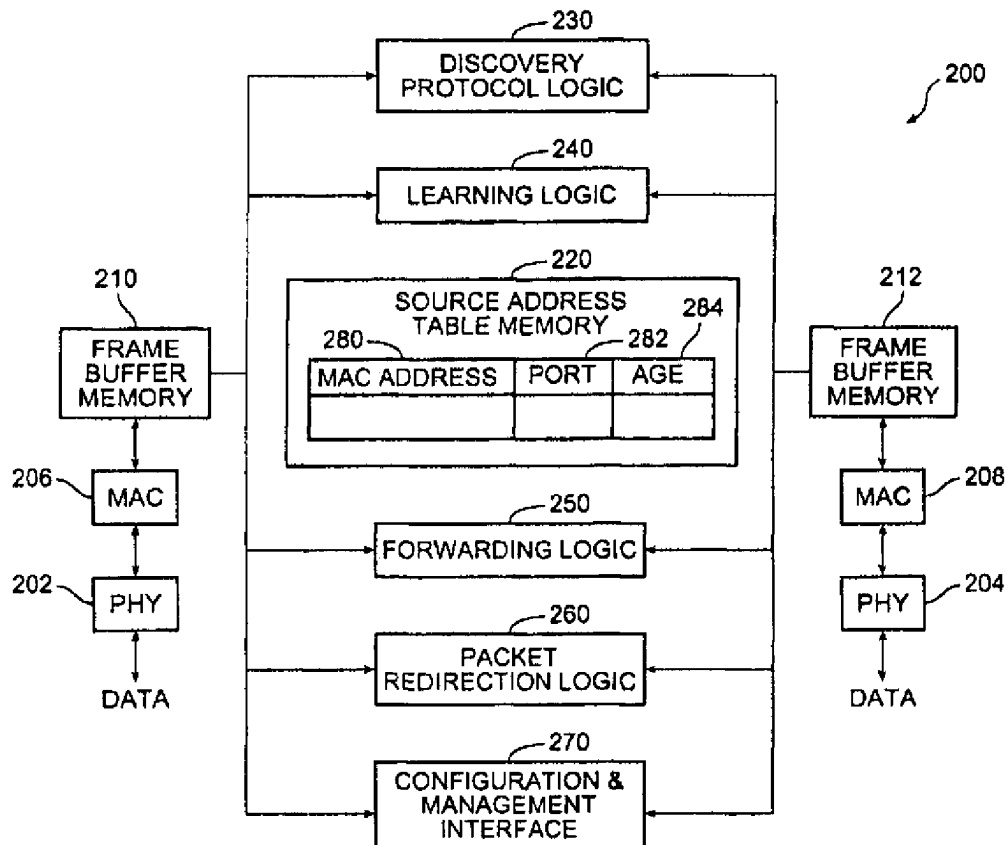


FIG. 2B

U.S. Patent

Jun. 30, 2009

Sheet 2 of 9

7,554,959 B1

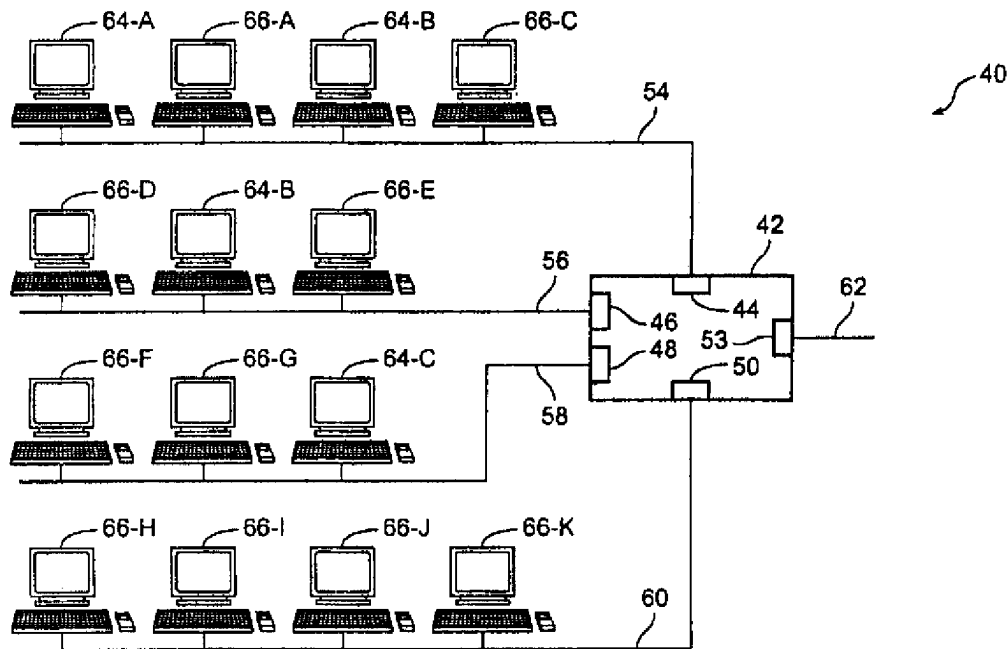


FIG. 3

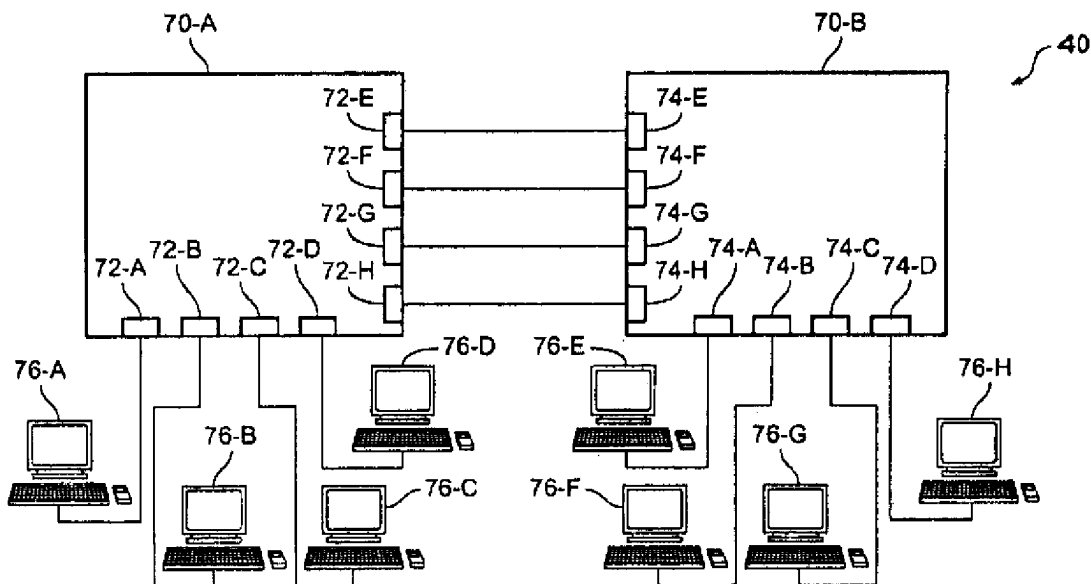


FIG. 4

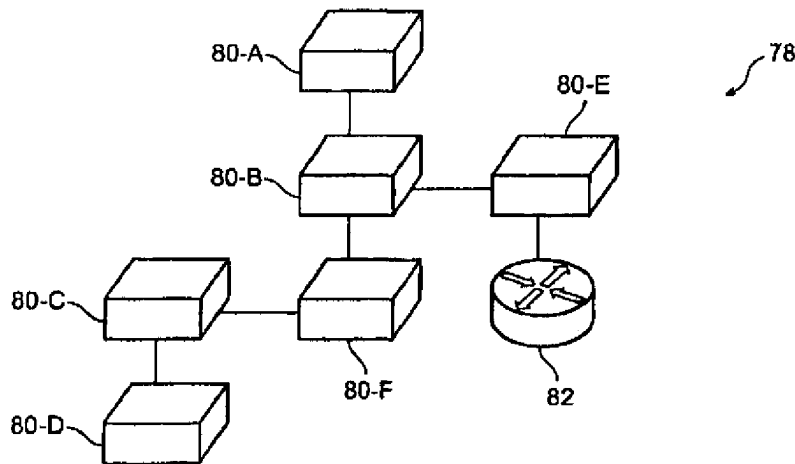


FIG. 5

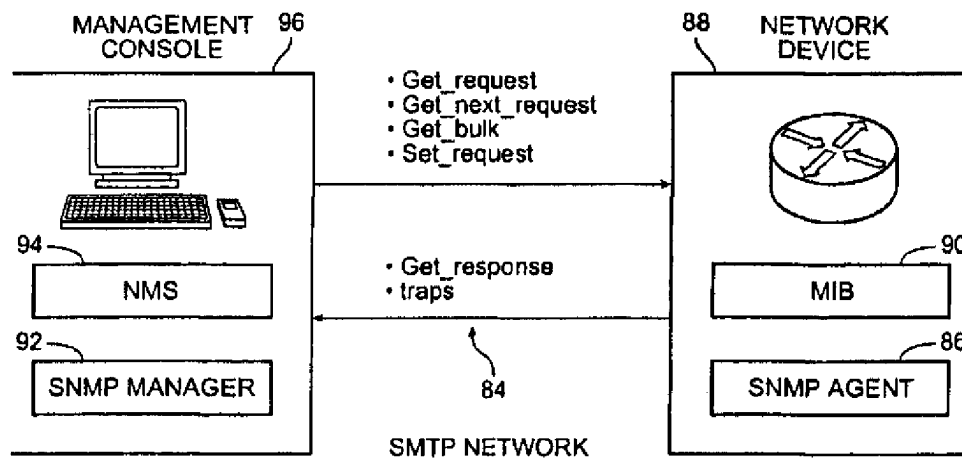


FIG. 6

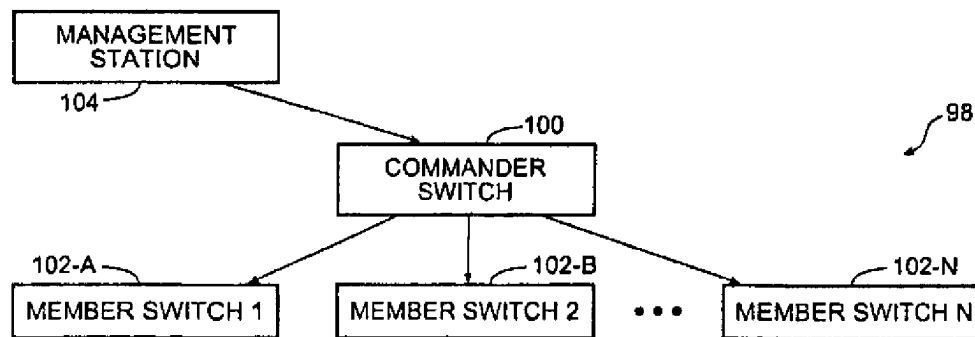


FIG. 7

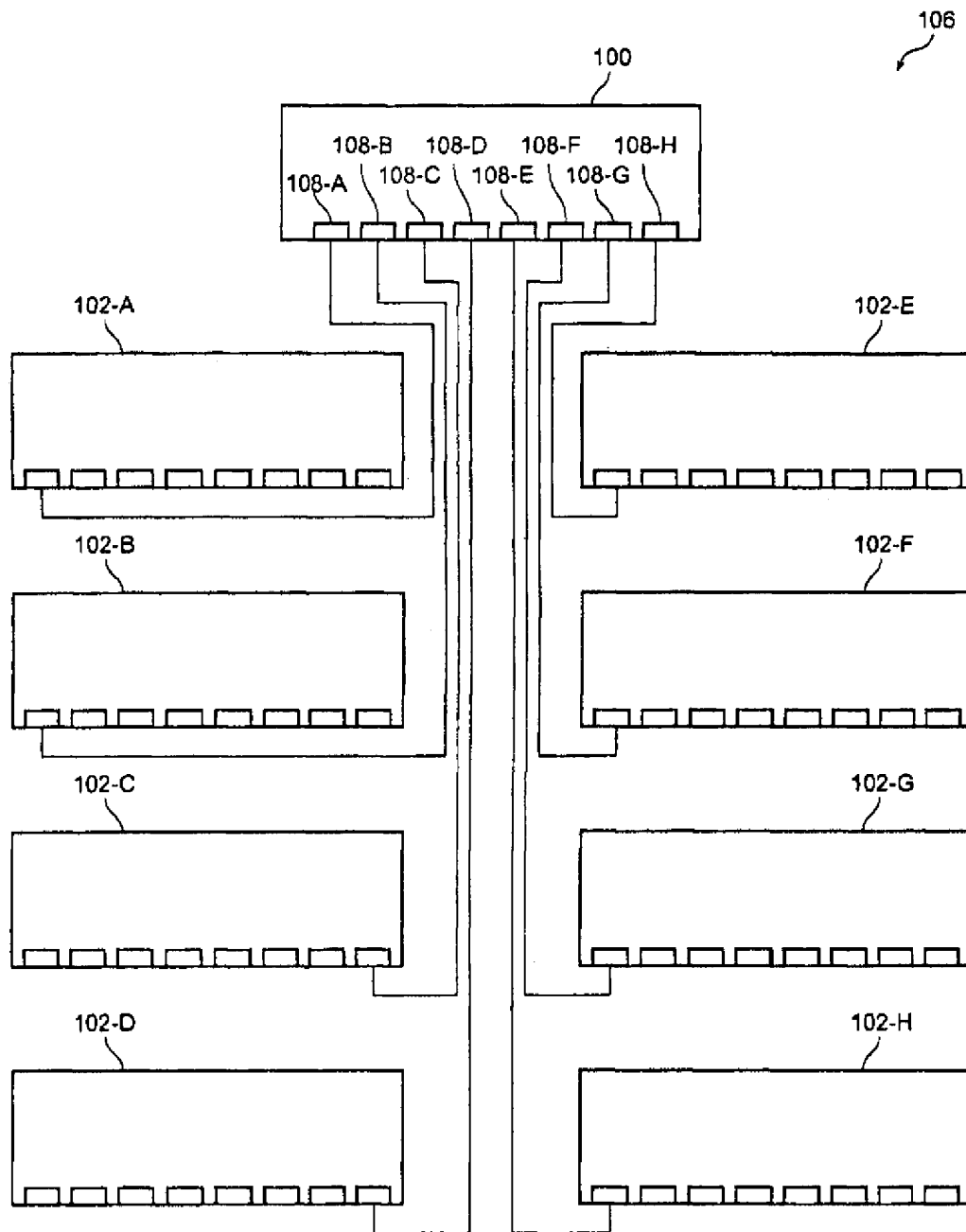


FIG. 8

U.S. Patent

Jun. 30, 2009

Sheet 5 of 9

7,554,959 B1

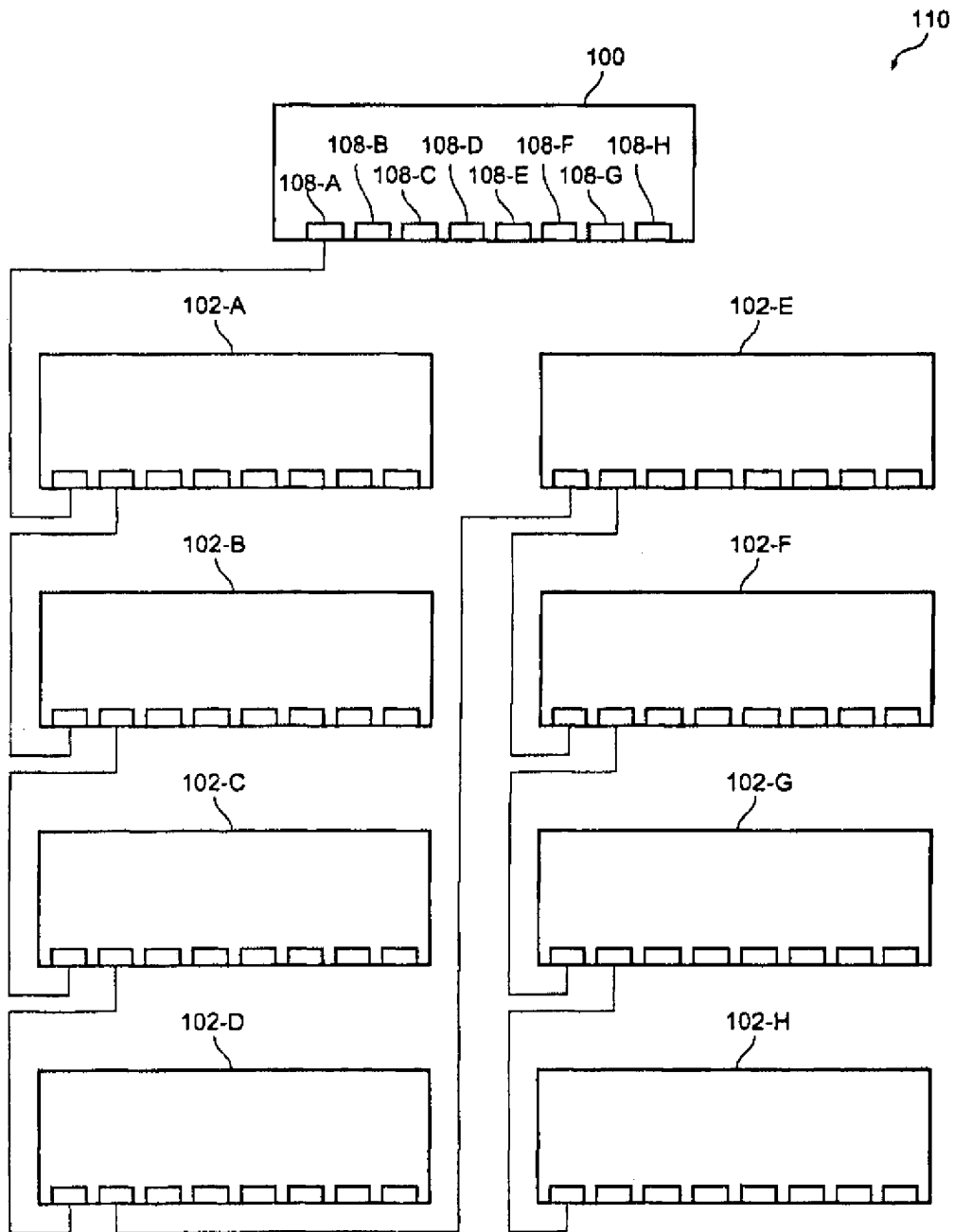


FIG. 9

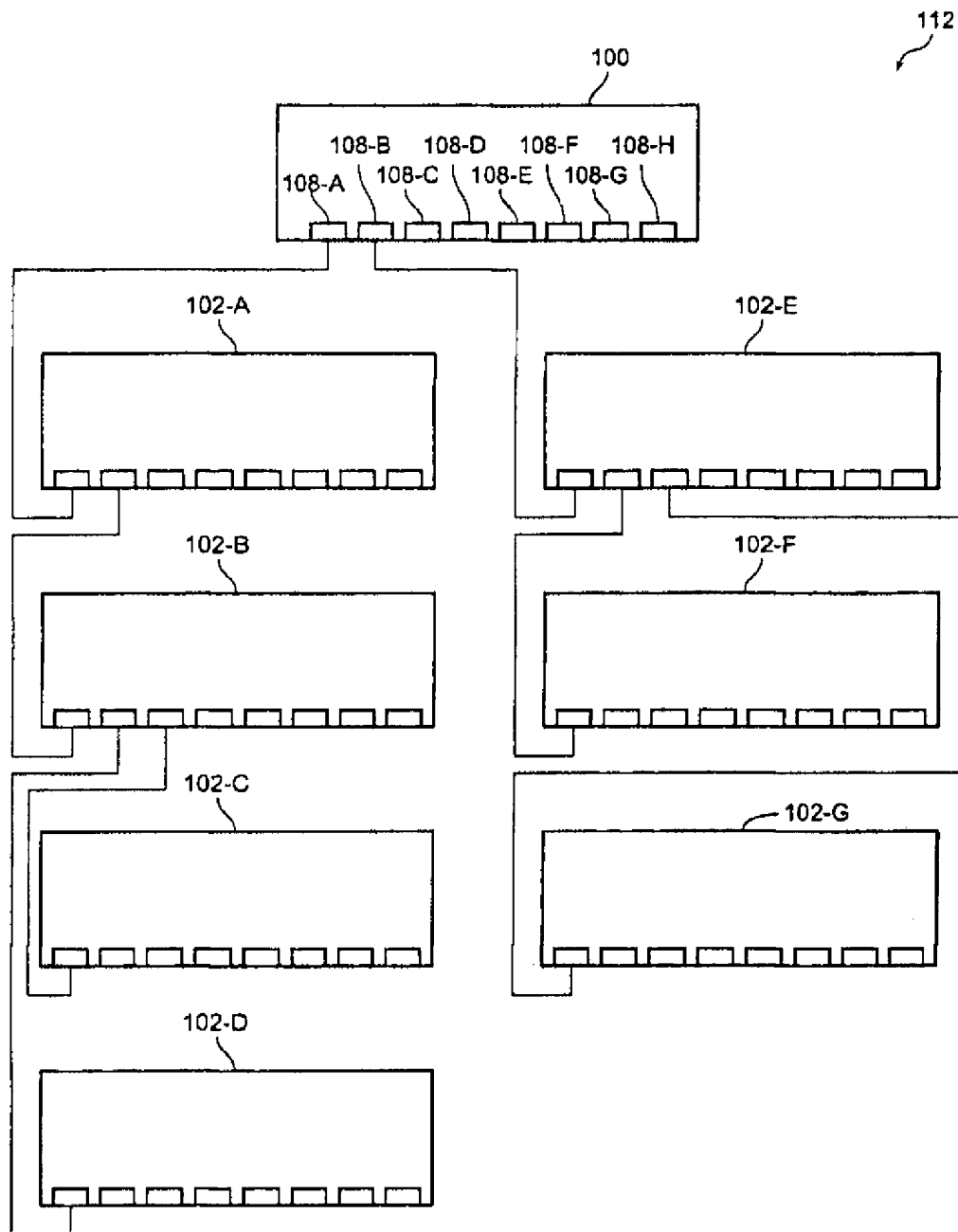


FIG. 10

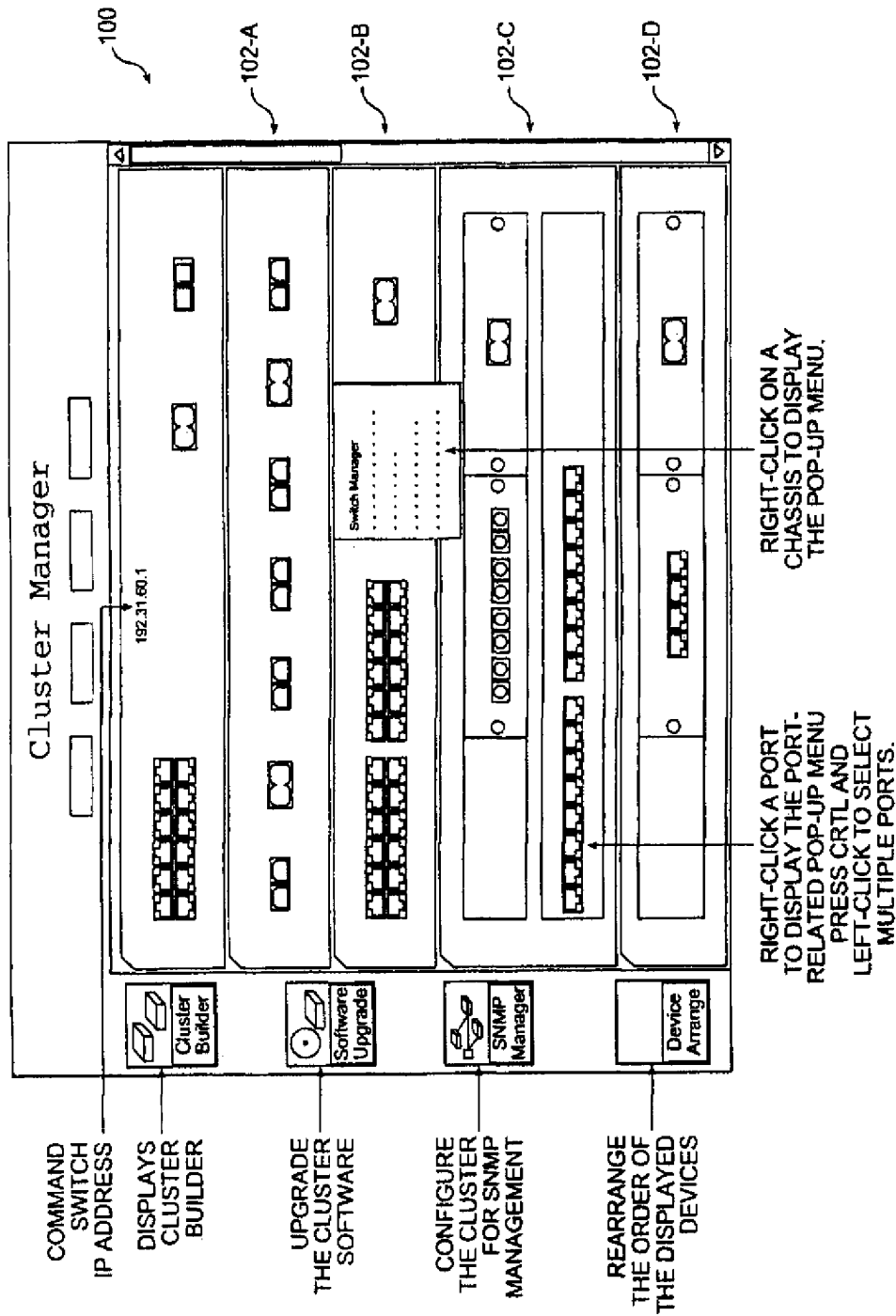


FIG. 11

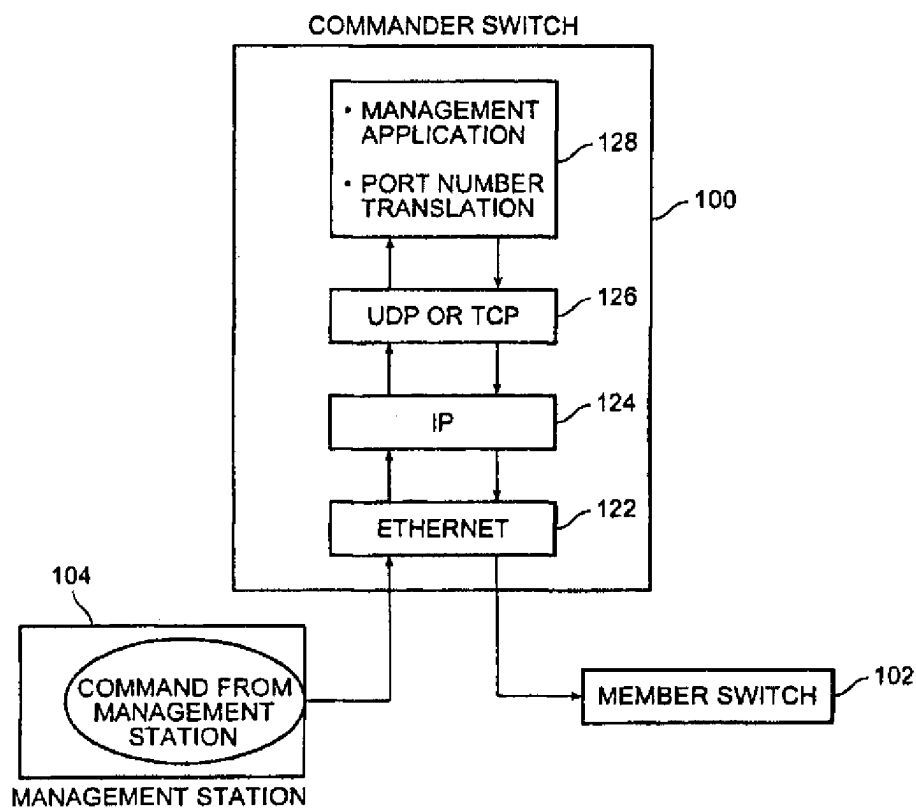


FIG. 12

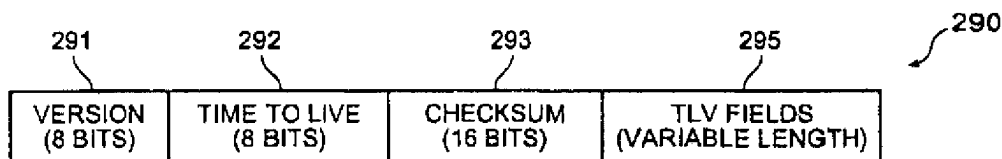


FIG. 13

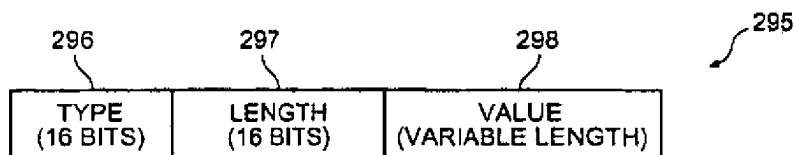


FIG. 14

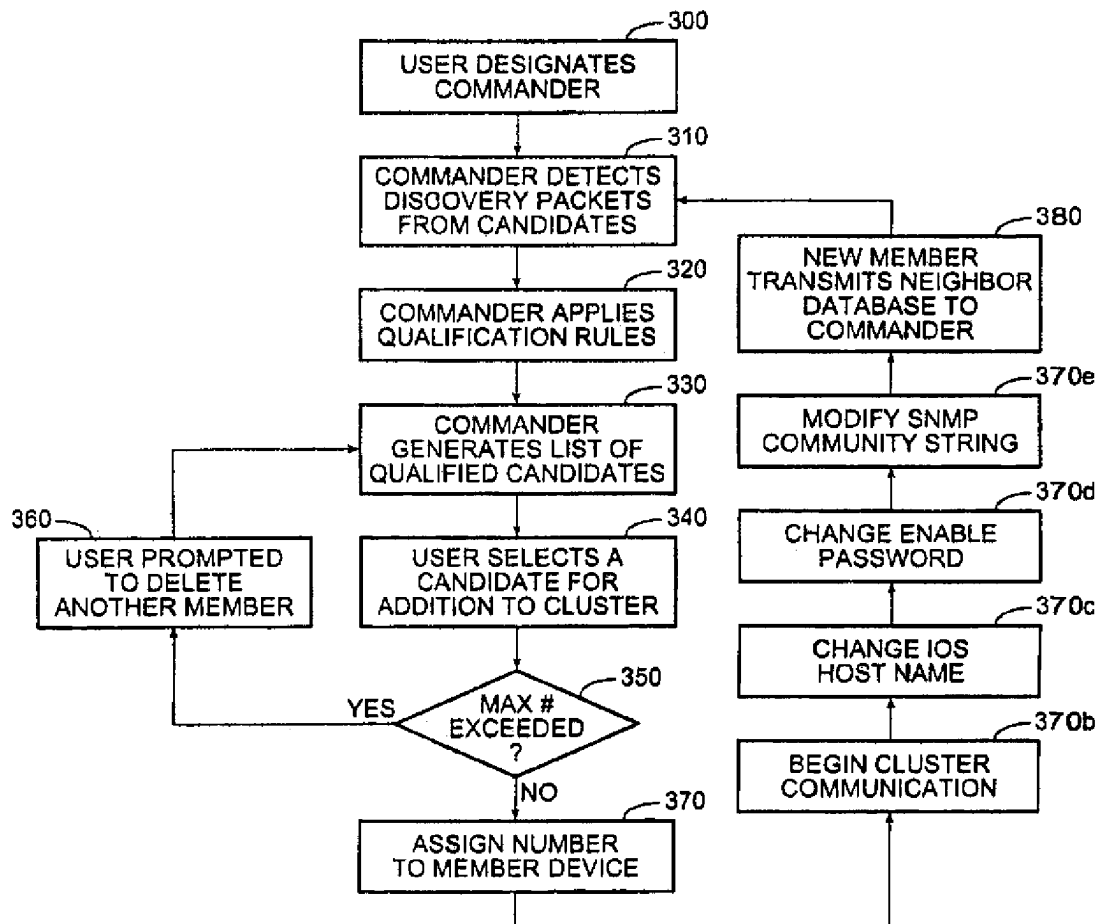


FIG. 15